FURTHER STUDIES IN THE MENTOR BEDS.

By ALFRED W. JONES, Kansas Wesleyan University, Salina.

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MY only apology for sticking to this subject is that my geological field-work has been limited to the counties of Saline, Lincoln, Ellsworth and McPherson during the past two years, and the fact that the Mentor Beds are not receiving much attention from other geologists.

The Dakota and its associations in Kansas afford a most fascinating field for investigation, and demand a thorough and careful study before many tangles can be unraveled.

Although I am not prepared to attempt any plan of division, I am inclined to believe that a very careful study of the Dakota would separate it into different leaf-bearing beds of different groups of plants interspersed with thin, shell-bearing layers.

The division line between Comanche and Dakota appears to be less distinctly marked as more light is thrown upon it. Three or four years ago I thought I was quite certain regarding some features of the Mentor; to-day, after much more investigation, I know much less about it. However, I am still inclined to believe that the "Mentor" proper lies at the base of the Dakota; that when thoroughly traced it will reveal to us the outlines of an ancient gulf, with several of the inlets marked by fossil beds containing only fresh- or brackish-water species.

I have now located three of these localities—one four miles north of Salina, in the Claflin pasture; one north of Brookville, on Mulberry creek; one about six miles northeast of Kanopolis, Ellsworth county, on the Smoky Hill river.

The Marquette region, southwest of Marquette, reveals a puzzling condition—in the bottoms of ravines we find Permian shales; resting upon this the calcareous shales of the Kiowa; then apparently typical Dakota sandstone bearing fossil leaves; and above this a heavy ledge of sandstone containing an abundance of Mentor fossils.

Although I have not had the opportunity of exploring very far southwest, I am informed that shell-bearing rocks outcrop at many places in western McPherson and eastern Rice counties that I did not visit.

Several more cases have been reported to me of shell-bearing strata having been found near the base of the Dakota in well-digging, and a few more surface exposures have been found in Saline county.

The shell beds near the top of the Dakota, in Ellsworth county, containing *Modiola pooli*, contain a small univalve that has not been determined.

With so much for the Mentor, I will add a note or two on the Dakota.

Professor Mudge, in writing of the Dakota, in the First Biennial Report of the State Board of Agriculture, said (after speaking of the irregular distribution of fossil-leaf beds): "The numerous indications show that the trees must have grown on islands near the shoreline, and that the leaves were embedded in the marine sediment immediately after dropping. Worm borings are also found in the same strata with the leaves."

Now, although this observation is probably in the main correct, I have been astonished again and again to find how widely distributed fossil vegetation is throughout the sandstones of the Dakota in this region. Several times I have been shown very good specimens of fossil leaves quarried or revealed in breaking rocks in localities that I had looked over and passed as utterly destitute of fossils; and I have learned by experience that diligent search will find traces of fossil vegetation almost anywhere in the Dakota, which seems to me to indicate that the ancient forests of the Dakota probably covered much more of the surface than I had at first supposed, but that conditions were much more favorable for preserving fossils in some localities than in others.

Reports have come to me several times, from sources that I can scarcely doubt, of the finding of fine leaf impressions in the clay beds of the Dakota revealed in cellar- or well-digging, and I regret that as yet I have been unable to see any specimens of these.